LAS GUIDE

Principles and Criteria

for the Adoption of Local Assessment Systems

CASE STUDIES

Prepared by the

Maine Department of Education

June 2003

Edited August 2003

Moose and Squirrel High Schools
Two Case Studies

to illustrate ideas, procedures, & requirements contained in Local Assessment System (LAS) Guide: Principles and Criteria for the Adoption of Local Assessment Systems

The two case studies that follow are intended for instructional purposes. They are hypothetical, and the high schools that they discuss are fictitious. The case studies are designed to illustrate the application of the Principles, Criteria, Rules, and Considerations defined in the Local Assessment System (LAS) Guide: Principles and Criteria for the Adoption of Local Assessment Systems. Importantly, they demonstrate the fact that there will be a variety of viable Local Assessment Systems. The two examples provided in Moose and Squirrel are different, and yet each, in theory, meets the requirements established for local systems. The hope is that using these cases as companion documents, the Principles and Criteria will be illuminated and better understood.

The case studies should be considered as examples showing the range of possibilities allowed by the Local Assessment System (LAS) Guide: Principles and Criteria for the Adoption of Local Assessment Systems. They should not, however, be construed as exemplary or as perfect models to be exactly imitated. Nor should any instructional or assessment philosophy articulated by either the Moose or Squirrel Schools be considered "the way" according to Maine's Department of Education.

Again, the DOE anticipates that these case studies, and others that may follow, will be useful to those seeking to understand and internalize the Principles and Criteria described in the Local Assessment System (LAS) Guide: Principles and Criteria for the Adoption of Local Assessment Systems.

Local Assessment System

Case Study I:

Certification in Mathematics

Moose High School

Local Assessment System Case Study I - Certification in Mathematics, Moose High School

Moose High School[1] is a 200-student high school; the only high school in Jackson District. Moose High School faculty has a long commitment to developing and using standard-based assessments in their mathematics classes. As a school they have become deeply familiar with Maine's *Learning Results*, *Measured Measures* and different forms of assessment.

They are meeting to develop the 9 - 12 mathematics component of the district's Local Assessment System (LAS) as required under state law and rules. They have studied the Local Assessment System (LAS) Guide: Principles and Criteria for the Adoption of Local Assessment Systems and associated documents issued by the Department of Education, and are making decisions about the system of assessments that needs to be put in place for certification.

As they began this process, they identified the values that have been implicit in the work at Moose High School and the Jackson School District regarding teaching, learning, and assessment of mathematics. They felt that these values should be reflected in both the instruction that students receive and in the design of the LAS.

Identified Values about mathematics curriculum, instruction, and assessment.

1) All courses and course paths should provide students with a full and fair opportunity to learn the concepts, knowledge, and skills in Maine's *Learning Results*, and all students should have a full and fair opportunity to demonstrate their knowledge and skills in relation to Maine's *Learning Results*.
2) While mastery of skills is important, it is not enough. Courses at Moose High School have incorporated a mix of skill and concept development, and application of mathematics through problems and large projects. ***All*** courses at Moose High School include important aspects of consumer applications and other applications of mathematics.
3) There are multiple purposes for assessment. Therefore, the set of assessments used for certification will be a subset of all the assessment that students will experience in the Moose High Schools Mathematics Program. The department decided to use smaller assessments like the assessment type "bundle" for ongoing classroom assessment, but to rely on other assessments for determining certification.
4) All courses and course paths should provide students with the opportunity to learn, practice and develop the content of Maine's *Learning Results* and be assessed at multiple levels from formative to summative. Information about student progress on standards and related performance indicators should be provided through observations from classroom discussions, quizzes, tests, and projects.
5) Assessment should be embedded in the instructional program.
6) Moose High School's LAS needed to address the multiple purposes of assessment.

[1] Fictional school created for this example to illustrate a possible way to deal with the decisions a school/district must make in creating a coherent system, sufficient, and fair local assessment system that will meet the requirements for high school certification.

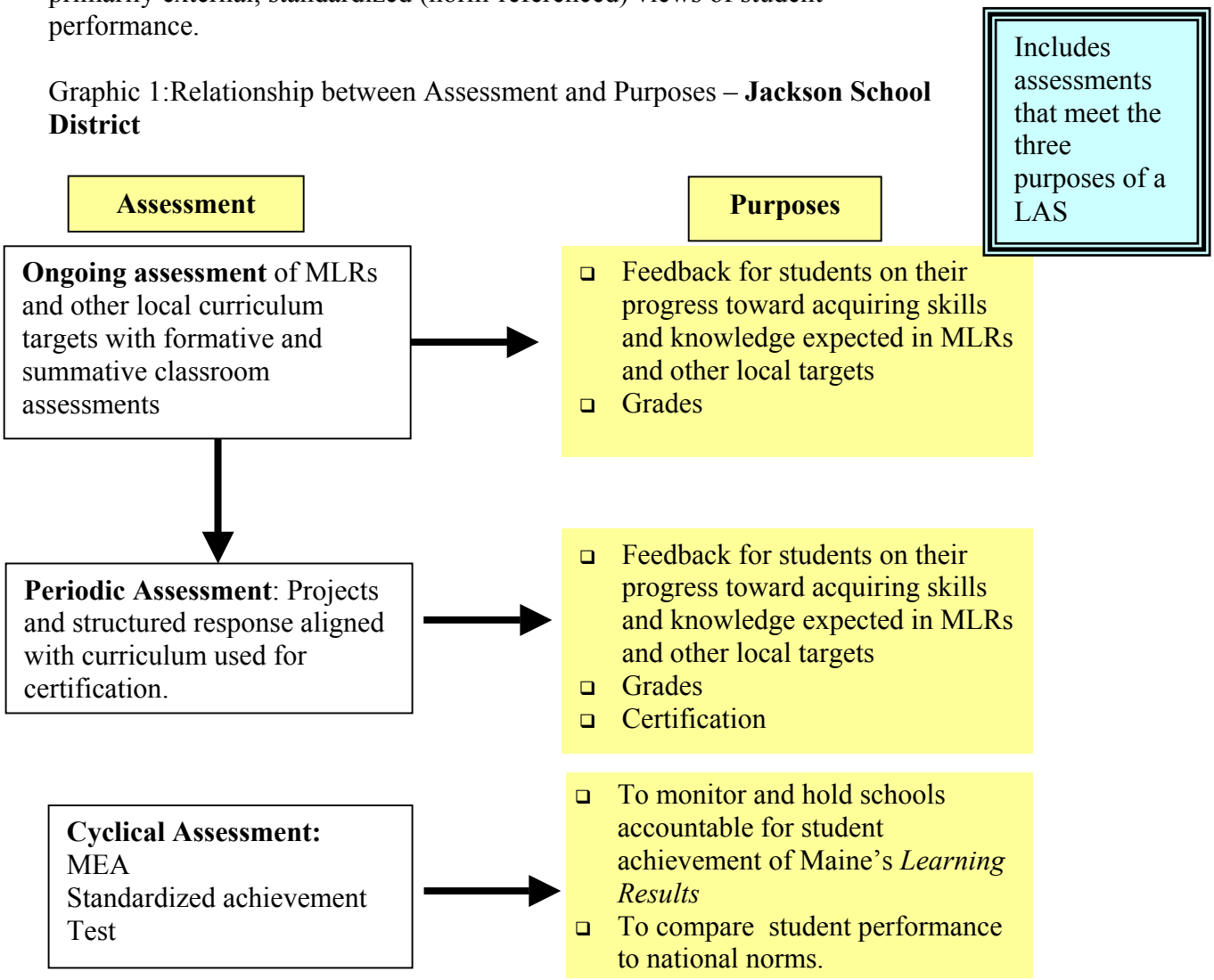
a) To inform teaching and learning regarding student achievement of Maine's *Learning Results*;
b) To monitor and hold schools accountable for student achievement of the standards; and
c) To certify achievement of standards.

Moose High School's faculty and administrators discussed how these values were consistent with the intent of the MLRs in mathematics, and with the values for assessment as articulated in *Measured Measures* and *Local Assessment System (LAS) Guide: Principles and Criteria for the Adoption of Local Assessment Systems.*

Jackson School District Local Assessment System: Moose High School

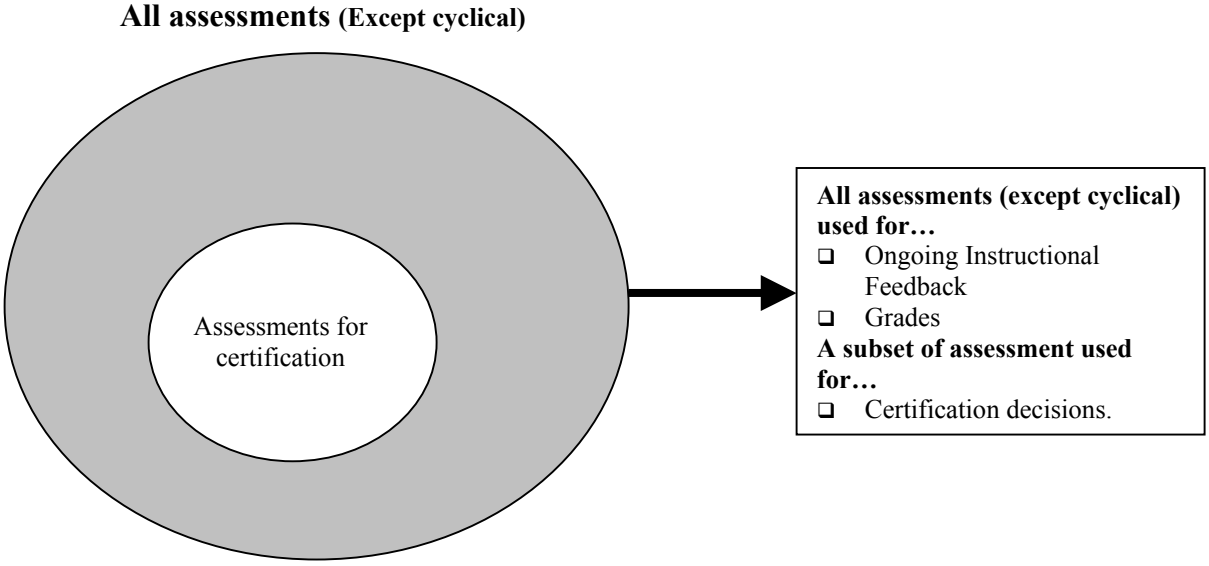
The students in the Jackson School District (K –12) participate in a variety of assessments that encompass a variety of purposes. These assessments include ongoing assessments, which are used primarily for classroom purposes, periodic assessments, which are used both for classroom purposes and from which certification decisions will be made, and cyclical assessments, which provide primarily external, standardized (norm-referenced) views of student performance.

Graphic 1:Relationship between Assessment and Purposes – **Jackson School District**



Performance results on all formal assessments are included in grades that students receive at Moose High School. Assessments for certification are a subset of all the assessments that students experience. Maine's *Learning Results* are a subset of the achievement targets for which Moose High School students are responsible.

Graphic 2:Relationship of Assessment for Certification Purposes to All Assessments (Except cyclical)



Alignment to Maine's *Leaning Results* Work to Date – To assure that all students had a full and fair opportunity to learn the mathematics concepts, knowledge, and skills articulated in Maine's *Learning Results* at Moose High School, the mathematics faculty completed the following.

Coherence: Curriculum aligned with Maine's *Learning Results*

1) Moose High School raised the requirement for high school mathematics from 2 mathematics courses to 3;
2) Moose High School reviewed all potential pathways that students could take in mathematics at Moose High School, and then aligned all courses and pathways with Maine's *Learning Results* to assure every student had the opportunity to learn, at minimum, the expectations in Maine's *Learning Results*.

While over 30% of the students at Moose High School complete four years of mathematics, the three paths that students can take to complete the three-year requirement are listed below. An analysis of each of the courses was conducted to assure that students had a full and fair opportunity to learn. Where gaps existed, the courses were modified.

Pathway 1: Algebra I, Geometry, Algebra II

Pathway 2: Integrated Mathematics I, II, and III

Pathway 3: Applied Mathematics I, II, III

To make choices about the assessments to be used in Local Assessment System (LAS) Guide: Principles and Criteria for Implementing LAS, the mathematics department understood what they needed to consider. They reviewed the principles and criteria provided by the MDOE. As a result they identified 5 steps that they needed to complete in order to develop their LAS in mathematics.

1) Review the MDOE Balance of Representation data and decide to either use the data to help prioritize standards and related performance indicators that should be assessed, or make other prioritization decisions.
2) Decide on the assessment types and their distribution that best samples the content clusters, standards, and the related performance indicators consistent with the prioritization.
3) Develop, adapt, or adopt assessments to be used as a part of the assessment system that fulfill the assessment types and distributions.
4) Make decisions about which assessments should be common to all students, and which assessment should not be common.
5) Decide in which courses students would complete the assessments.

Prioritization of Clusters, Standards, and Performance Indicators

Graphic 3 illustrates the relationship between the clusters, standards, and performance indicators for certification purposes. Table 1 provides the data from the statewide Balance of Representation study. The department members understood that the certification decision was at the content area level, not the content cluster or content standard level. They also understood that in order to achieve adequate representation across mathematics to make a reliable and valid decision for certification the assessments that were selected would have to sample every standard at least once, and every content cluster multiple times (at least 5 times). Moose High School's plan assesses each content cluster 5 or more times. It was also important to them to consider Form and Function for all assessments. (Note: This does NOT mean that there are 5 or more separate assessments for each content cluster.)

Graphic 3: Relationship between content area, clusters, and standards for Certification Decision and sufficiency to obtain reliable and valid results

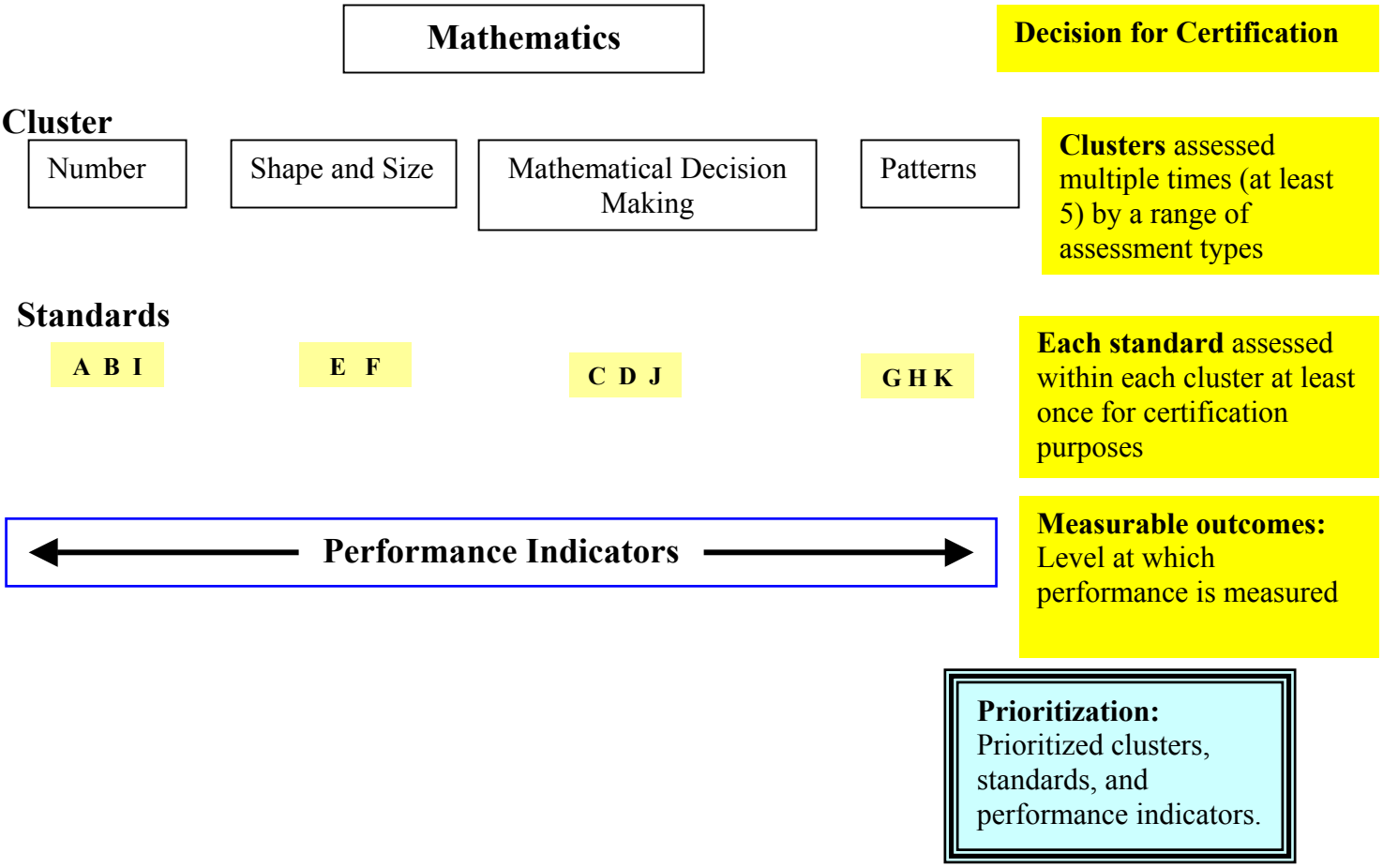


Table 1: Statewide Balance of Representation (BoR) in Mathematics Grades 9 -12

Mathematics										
Number (21%)			Shape and Size (18%)		Mathematical Decision Making (22%)			Patterns (39%)		
A- 7%	B - 6%	I - 9%	E - 11%	F - 7%	C-12%	D - 6%	J - 3%	G - 15%	H - 15%	K - 9%
39%	32%	29%	62%	38%	52%	23%	25%	38%	40%	22%
1 – 50%	1 – 70%	1 – 17%	1 – 29%	1 – 50%	1 – 21%	1 – 51%	1 – 100%	1 – 27%	1 – 27%	1 – 50%
2 – 50%	2 – 30%	2 – 30%	2 – 36%	2 – 50%	2 – 24%	2- 49%		2 – 29%	2- 19%	2 – 50%
		3 – 13%	3- 35%		3 – 20%			3 – 26%	3 – 27%	
		4 – 40%			4 – 21%			4 – 18%	4 – 27%	
					5 – 13%					

BoR across standards

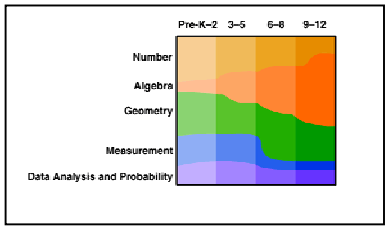
Prioritization ensures that the "Breadth" of the discipline is assessed

The department reviewed these data and used them to make decisions for prioritizing clusters, standards, and performance indicators for assessment purposes. With the exception of performance indicators for standard B.2, I.1, and I.3 the faculty committee decided that the differences at the performance indicators level were not significant. Therefore, all performance indicators are "fair game" for assessment purposes. They also reviewed the Balance of Representation across the standards and found the differences were also not significant. Finally, they reviewed the Balance of Representation across clusters and made the following observations.

1) **Across Clusters: The data indicate that the Patterns cluster should be assessed more** than the other clusters.
2) **Number Cluster:** In general the faculty interpreted the differences between standards A, B, and I as insignificant.
3) **Shape and Size:** Although the BoR for Number, Shape and Size, and Mathematical Decision Making would lead one to believe that assessment should be similar across these clusters, the faculty reviewed national literature that supported more curricular focus on geometry at high school than Number and Mathematical Decision Making.

Local flexibility applied to decide method for prioritization.

The *PSSM* Content Standards Distribution[2] for curriculum



Emphasis purposes.

4) **Mathematical Decisions Making:** When compared with standards D and J standard C should be sampled more heavily.
5) **Patterns:** Emphasis should be placed on standards G and H.

The Jackson School District has adopted the broader definition of reasoning and communication articulated in *Principles of Standards for School Mathematics, 2000*, than standards J and K in Maine's *Learning Results*. As a result, the faculty has embedded standards J and K in each of the mathematics Cluster.

> "Reasoning and proof are not special activities reserved for special times or special topics in the curriculum, but should be natural, ongoing part of classroom discussions, no matter what the topic is being studied." (PSSM 2000, page 342).[3]

Opportunities for Assessing the "Depth" of the Learning Results:

Assessing Depth: Identified standards and related performance indicators that are best assessed through a large project or investigation.

To capture the depth of the mathematics discipline the department members reviewed the mathematics standards and related performance indicators in Maine's *Learning R*esults. Since the department members

[2] *Principles and Standards for School Mathematics (PSSM)*, NCTM, April 2000.

[3] Ibid.

valued the application of mathematics in larger projects, more realistic of the type of experiences students would have upon graduation, they included projects as an important assessment type.

The first choice they made was related to standard C. While they felt that they could assess each of the performance indicators with small assessments like bundles, they decided that type of assessment would be better as a part of regular classroom assessment in preparation for a larger investigation in which they would be required to address C: 1 – 5, and J. They decided that all students would complete a statistical study during their high school experience. See Appendix A for the Item Specification the department made for Statistical Studies.

Standards E and F offered the opportunity for larger projects as well. They decided that students at Moose High School would complete 1 measurement project and 1 concept project during their high school experience.

The Measurement Project for Pathway 3 included the development of a scale model in which students had to meet certain specifications. The measurement project for Pathway 1 would provide an analysis of a series of formulas to illustrate the relationships among different two and three-dimensional figures. Pathway 2 could choose either the development of a model or the derivation of formulas projects. Although these projects treat different indicators, the faculty are determined that the level of rigor be similar and depth of mathematical understanding be comparable for the projects.

Distribution of Assessment Types

Assessment Types and Distribution: Assessment types and distribution identified

Moose High School faculty and administration decided that the distribution across assessment types would be as follows.

Table 2: Distribution of Assessment Types for Certification

Assessment Type	Number of Assessments
Bundles	None
Structured Response	10
Statistics Study	1
Projects	3
Total Number of Assessments	14

MHS Blueprint for 9 - 12 Math

Because Moose High School has not developed any common district Structured Response assessments, the faculty decided to use the MAP and LAD Assessments available from the MDOE for the Structured Response assessments. However, the faculty is committed to developing the projects locally. Teachers have had experience in the development of projects and have some examples with student work. Appendix A contains draft item specifications for the Projects.

Table 3: Distribution of Assessments (Note: **Bolded** assessments are common to all students. Unbolded assessments are specific to the mathematics pathway. Fours (4) in table indicate the highest level of points possible from each rubric aligned to each performance indicator assessed. "P" indicates that the type of assessment has the potential to sample given performance indicators.) All assessments selected meet the Standards for Assessment (Chapter 127, Section 4.02) with the exception of the projects under development. A plan is put in place to assure that the new assessments meet the Standards for Assessment.

MHS Blueprint for 9 - 12 Math

*P denotes that students choose a performance indicator from one of these standards for their project.

		Mathematics																
		Number					**Size and Shape**				**Mathematical Decision Making**				**Patterns**			
		A	B	I	J	K	E	F	J	K	C	D	J	K	G	H	J	K
Total Number of Assessments in Cluster		4					4				2				5			
	Type of Assessment																	
Statistical Study I	Statistics Study										16		4					
Concept Development Project I	Project	P*	P*	P*		4												
Concept Development Project II	Project														P*	P*		4
Measurement Project	Project							4	4	4								
Builders are Us!	SR - Concept						8											
The Softball Set up	SR -						8											
Wire Triangle	SR															8		
The Number Line	SR -	4	4		4	4												
Buying a Jet Ski	SR -														8	4		
Bagels and Donuts	SR -														4	4	4	
Surprise	SR -			4	4	4												
The Deep End	SR -							4	4	4								
Community Growth	SR -			4											4	4		
Probability Booth	SR -											4	4	4				
		36+					40				32				44+			

Sufficiency and Reporting: Each content cluster for Moose High School is assessed at least 5 times. (Minimum requirement for reporting information at the school level is 5 times.)

Review

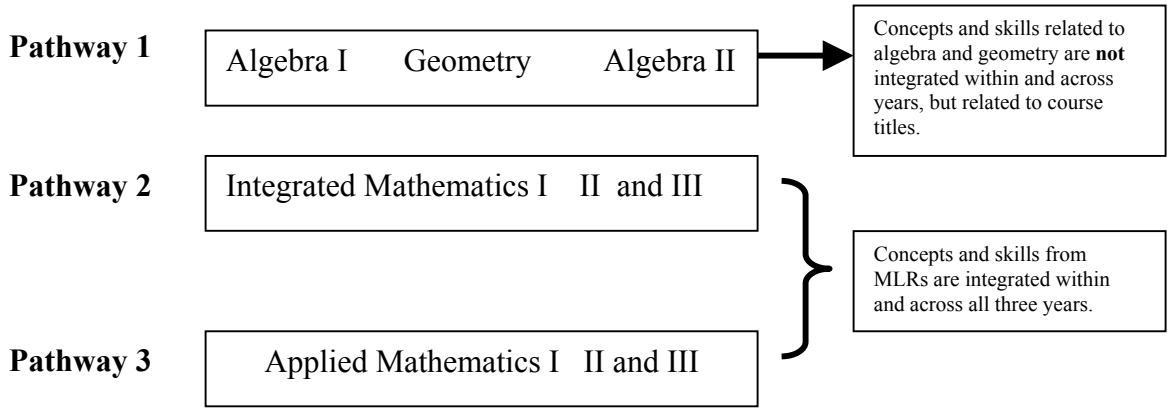
The team reviewed their decision to determine how closely their distribution of projects and constructed response questions met the BoR. The faculty decided that they are satisfied that they have sampled the breadth and depth of clusters and the related standards and performance indicators. The faculty is also satisfied with the degree to which the Balance of Representation (# of assessments) is consistent with their decision to sample Patterns and Shape and Size more heavily than the other content clusters.

Embedding Assessments into Instructional Program

Method of embedding assessments in the instructional program

As identified earlier, an important value at Moose High School is embedding assessments into the instructional program. Therefore, the next step for the Moose High School mathematics faculty was to review each mathematics Pathway and embed the assessment activities appropriately.

Graphic 4: Relationship of Mathematics Pathways and Placement of Assessments



Tables 4, 5, and 6 indicate the distribution of the assessments in each of the pathways.

Table 4: Pathway 1 – Distribution of Assessments for Certification into the Instructional Program (common assessments **bold)**

	Algebra I	Geometry	Algebra II
Statistical Study I	**X**		
Concept Development Project I		X	
Concept Development Project II			X
Measurement Project		X	
Builders are Us!		X	
The Softball Set up		X	
Wire Triangle			X
The Number Line	X		
Buying a Jet Ski	X		
Bagels and Donuts			X
Surprise			X
The Deep End		X	
Community Growth			X
Probability Booth	X		

Table 5: Pathway 2 – Distribution of Assessments for Certification in Instructional Program

	Integrated I	Integrated II	Integrated III
Statistical Study I	**X**		
Concept Development Project I		X	
Concept Development Project II			X
Measurement Project	X		
Builders are Us!		X	
The Softball Set up	X		
Wire Triangle			X
The Number Line	X		
Buying a Jet Ski	X		
Bagels and Donuts		X	
Surprise			X
The Deep End		X	
Community Growth			X
Probability Booth	X		

Table 6: Pathway 3 – Distribution of Assessments for Certification into the Instructional Program

	Applied I	Applied II	Applied III
Statistical Study I			**X**
Concept Development Project I	X		
Concept Development Project I			X
Measurement Project	X		
Builders are Us!		X	
The Softball Set up			X
Wire Triangle			X
The Number Line	X		
Buying a Jet Ski		X	
Bagels and Donuts		X	
Surprise			X
The Deep End		x	
Community Growth			X
Probability Booth	x		

Comparability, Replacement, Performance Standards, and Public Reporting

Comparability, Replacement, Public Reporting, and Performance Standards

A district wide panel will decide how Jackson School District will implement the criteria for Comparability, Replacement, Performance Standards , and Public Reporting. Members of the Moose High School mathematics faculty will serve on that working group to assure that the unique features of mathematics are represented in the district wide decision-making.

After considerable discussion the mathematics faculty identified the following values as they relate to Comparability, Replacement, Performance Standards, and Public Reporting.

Comparability

The mathematics faculty made the following decisions relating to comparability.

1) All students must be included in local assessments through any combination of standard administration, administration with accommodations or alternate assessments. The distribution and assessment types are the same for all[4] Moose High School students and common assessments taken with accommodations are considered common assessments.
2) 11/14 (79%) of the assessments are common assessments.
3) Decisions have been made about which assessments are repeatable and which must be replaced. (See Replacement #4.)
4) All assessments used for certification have at least 20% of the student papers for each teacher double scored. If the exact scorer agreement is less than 70% on the double scored paper, then all papers will be doubled scored. Disagreements between scores will be resolved with a third scoring.
5) All assessments for certification are selected, adopted or developed to meet the Standards for Assessment in Chapter 127.

Replacement

Moose High School mathematics faculty agrees that students should be allowed to replace weaker performances with stronger performances. However, they believe it is a joint responsibility of the faculty and students to assure that students have the prerequisite skills to be successful on assessments administered for certification purposes. They have decided the following.

1) If students have had the opportunity to learn the prerequisite skills, but have not met the standard for Certification, or are **not** on schedule for meeting the standard for Certification, then they should be able to replace a weaker performance with a stronger performance.
2) Students should ***not*** have the opportunity **to replace <u>every</u>** weak performance with a stronger performance. Replacement opportunities should be provided ***only*** if a student is in jeopardy of not graduating or is not on schedule to graduate. This determination is made by the student and her or his advisor at the end of each year.

[4] Students with an Individualized Education Plan (IEP) or 504 Plan, and students with limited English proficiency are provided with appropriate accommodations identified in individual educational plans. Decisions about students requiring an alternate assessment will be made by the Special Education Department.

3) Students should not receive more than 2 opportunities to replace a single assessment within a cluster.
4) Replacement of a Statistical Study can be achieved by addressing a new question or claim. Because of the large size of the "Statistical Study" the faculty have decided to design replacement items around scenarios that would let students replace one indicator without redoing the entire study. When more than one indicator is not met students should do a new study to demonstrate their achievement in a valid way. Replacement of a Conceptual Project can be achieved by studying another concept within the same content cluster. Structured response questions are to be replaced by new structured response questions within the same content standard.
5) Students cannot replace an assessment unless they can verify that they have received additional instruction.
6) It is the student's responsibility to schedule additional instructional time either with the classroom instructor or through the Academic Intervention Center at Moose High School.

Performance Standard

Moose High School has adopted the MDOE performance standards Alternative Method.

Alternative: "Pattern of Performance"

Students must establish a pattern of performance with a specified modal score for the content area and no less than the specified mode for any content cluster to achieve each level of performance.

Performance Level	Mode* Across All Assessments	No Cluster Mode Lower Than
1. Does Not Meet	1	1
2. Partially Meets	2	1
3. Meets	3	2
4. Exceeds	4	3

*For bimodal performance, use the mean of the modal scores.

Reporting

Student information is readily available to students and parents on each assessment so they can track progress toward meeting the requirements for Certification. Moose High School faculty provides students regular feedback on their progress toward acquiring the knowledge, concepts, and skills in MLRs and other Moose High School targets as a part of the grading system.

Appendix A: Item Specifications for Assessment Types for Mathematics

Moose High School Projects	Moose High School	Structure	Points Possible
General Description: There are 2 types of projects at Moose High School. ❑ **Concept Development Project** ❑ **Measurement Project** **Replacement:** Projects should be replaced with another project within the same content cluster, or same standard. If the project is the only assessment of a standard then the replacement should be within the same standard in order to maintain the distribution.	**Concept Development Projects** assess Number and Patterns Clusters K2. **Measurement Projects** assess F.2, J, and K in the Shape and Size Cluster,	**Students Interaction:** Students may select the topic or the teacher may assign the topic or project to be completed. Students work independently. **Structure:** Common guidelines are being developed for the three types of projects. **Concept Development Project**: Students identify or are provided with a concept to study. There are two aspects to this project: 1) Fully explaining the concept using models and other representations on a poster and in a written report. 2) Providing examples of how the concept is applied. **Measurement Project:** There are two types of Measurement Projects: 1) **3 – D Model:** Students are asked to make a three-dimensional scale model of an object. The volume and surface area of the object are to be calculated. 2) **Formula derivation:** Students are to demonstrate how surface and volume formulas are derived using models, diagrams, and explanations.	**Points:** **Concept Development:** 8 – 16 points **Measurement Projects:** 12 points .

Appendix A: Item Specifications for Assessment Types for Mathematics

Assessment Type Structured Response	**Recommended Cluster/Standards/Performance Indicators Assessed**	**Recommended Structure/Format/Setting**	**Example MAP or LAD Assessments**
General Description: A structured response assessment is defined by students being provided a set of guiding questions and/or formats in which to respond to a topic or problem. To respond to this assessment type, the student does not have to make decisions about the questions that need addressing, or the format in which to respond. The cognitive demand of the question increases across the assessment. A structured response should include both content and process demand either by assessing J and K or by the implied cognitive demand of the performance indicators assessed. **Replacement:** A structured response should be replaced with another structured response that assesses the same standard.	Reasoning (Mathematical Decision Making) and Communication (Patterns) are standards that are features of <u>most</u> structured responses. (The models should deal with distribution.) Computation should be counted or scored only in structured responses where an extensive amount of computation is required.	**Student interaction**: Students respond to a given prompt(s). The work method is prescribed as to which standard will be demonstrated within the response **Structur**e: A prompt or set of prompts that describes a problem situation and asks for a student response with a clear expectation of what is expected of students. The item prompts may be scored on process (Reasoning and/or Communication) and one to three content performance indicators. **Interaction of process and content:** Most structured response questions require students to demonstrate achievement in both process and content either through the direct assessment of performance indicators J or K, or through the cognitive demand implied in the performance indicator assessed. **Setting:** Structured response items are treated as a whole. The items usually take more than one class period to complete and may require extended time.	**Examples** Buying a Jet Ski **Points:** Depending on the number of dimensions tested a structured response ranges from 8 (2 dimensions) to 16 (4 dimensions) points

Appendix A: Item Specifications for Assessment Types for Mathematics

Moose High School Statistical Study	Moose High School	Structure	Points Possible
Statistical Study – In a statistical study at the high school level students identify a question or issue to address, design the data collection tools, collect the data, organize and appropriately display the data to address the question or issues. Students analyze the data and draw conclusions based upon the findings. **Replacement:** A statistical study should be replaced by another statistical study that addresses a different topic or question.	**Statistical Studies** assess Standards C and K in the Mathematical Decision Making Cluster. • At grade 9 the Statistical Study will assess performance on 4 performance indicators from standard C depending on the project and J.1.	**Students Interaction:** Students may select the topic or the teacher may assign the topic or project to be completed. Students work independently. **Statistical Study:** Students identify or are provided with a question/claim, devise a study to evaluate the claim/question, collect appropriate data to study the claim/question, appropriately represent data collected, and draw conclusions. The product is a written summary of the question/ claim that was studied. **Setting:** This project would be developed over an extended period of time. .	**Points:** **Statistical Study:** 20 points .

Local Assessment System

Case Study II:

Certification in Mathematics

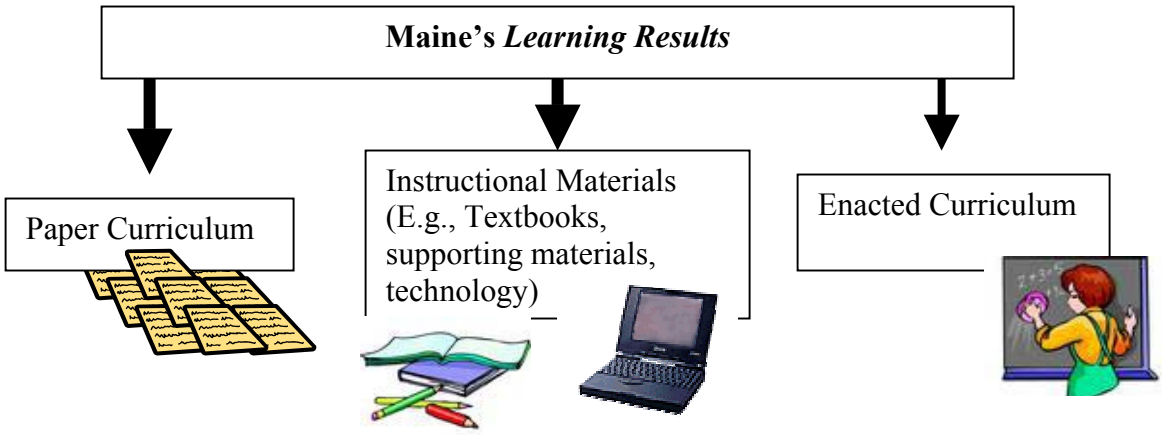
Squirrel High School

Local Assessment System Case Study II: Certification in Mathematics, Squirrel High School

Background: Opportunity to Learn

In 1998 the East Coast School District (K –12) mathematics committee made a number of important curriculum decisions that have a direct impact on the development of the Local Assessment System. The East Coast School District (ECSD) was concerned at that time that the existing curriculum – both paper and "enacted[5]"– was not strongly aligned with Maine's *Learning Results* adopted in 1997. The decision to conduct a study was directly related to assuring that *ECSD students have a full and fair opportunity to learn* the concepts, knowledge, and skills articulated in Maine's *Learning Results*.

The district conducted a yearlong study that involved a gap analysis between the paper curriculum, the materials used by teachers – both textbook and supplemental, and the "enacted" curriculum. The study revealed a large gap between the paper and "enacted" curriculum from classroom to classroom, and even larger gaps between East Coast School District curriculum and expectations in Maine *Learning Results*.

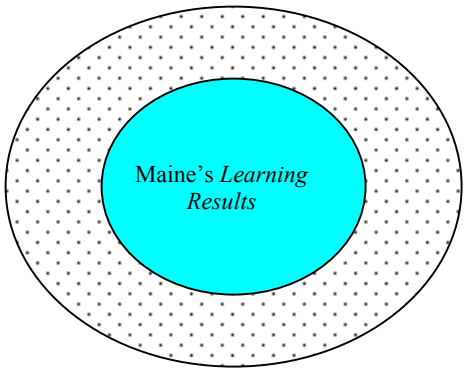


As a result of the study, the district mathematics committee made the following recommendations to the East Coast School District's Board. The ECSD Board subsequently adopted the recommendations.

[5] "Enacted" curriculum refers to the curriculum that students received through the instructional program.

1) The district mathematics committee would assure that the expectations in Maine's *Learning Results* were articulated in the local paper curriculum.

East Coast District Mathematics Curriculum



2) The district mathematics committee would recommend mathematics curriculum materials (textbooks and supporting materials).
3) Each school would recommend curriculum materials (textbooks) that were aligned with the expectations in Maine's *Learning Results* and the ECSD curriculum.
4) A system would be put in place to implement new curriculum materials.
5) A system would be put in place to assure that the "enacted" curriculum was consistent with the paper curriculum and instructional materials.
6) At the high school level, ECSD students would be required to complete 3 years of the same mathematics curriculum. *(Note: The high school mathematics faculty decided to implement an integrated*[6] *mathematics program.)*
7) The committee would put into place a 5-year implementation plan that included the development of the Local Assessment System.

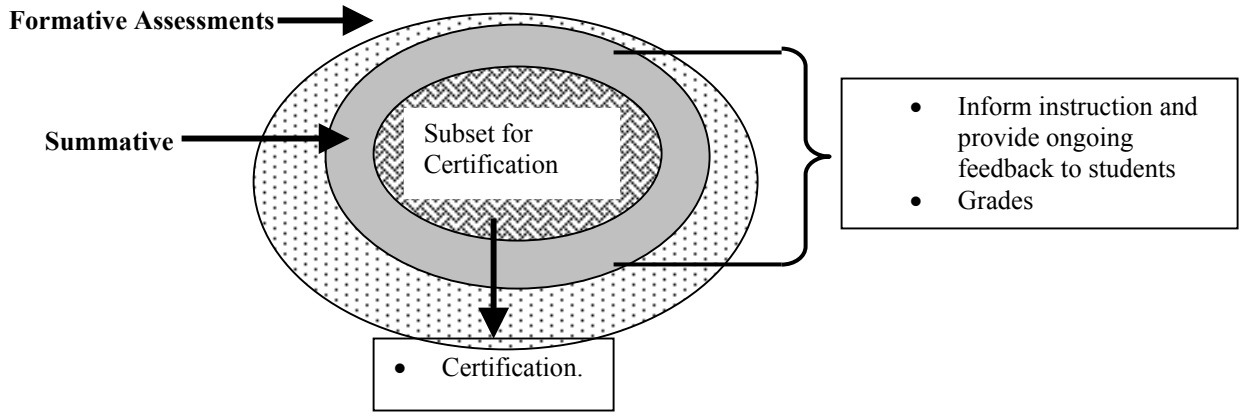
Background: Assessment

In 2001 the District Mathematics Assessment Committee convened to start work on developing assessments – both formative and summative - that would provide information about student learning in relationship to the local curriculum and Maine's *Learning Results*. At that time the high school committee decided the following:

1) Formative assessments would be developed to support continuous feedback on concepts, skills, and knowledge in the ECSD curriculum and Maine's *Learning Results*.

2) Summative assessments would inform instruction, and would be used for grading as well. The thinking at this point was to assume that some subset of the summative assessments and projects would be used for certification purposes and graduation.

[6] In an integrated mathematics curriculum related geometry, measurement, algebra, statistics, and probability concepts and skills are interspersed in each year of instruction for all three years, instead of, for example, focusing algebra concepts in a single course.



3) To help focus both the curriculum and assessment in relationship to Maine's *Learning Results* the committee conducted a Balance of Representation Study as outlined in *Measured Measures*. (The BoR study is more fully explained below.)

The Present

Squirrel High School[7] is one of two high schools in East Coast School District. Faculty members from both high schools are meeting to develop their Local Assessment System (LAS) as required by state law and rules. Faculty members have studied the "LAS Guide: Principles and Criteria" and associated documents issued by the Department of Education, and are making decisions about the system of assessments that needs to be put in place for certification.

The goal of the meeting is to decide on the assessments and the distribution of the assessments to use for certification at each of the high schools.

The faculty members reviewed the "LAS Guide: Principles and Criteria" provided by the MDOE. From the guidelines, 5 steps were identified for the group to complete in order to develop the ECSD high school LAS for mathematics.

6) Prioritize performance indicators to be assessed for certification.
7) Decide on the assessment types and their distribution that best samples the content clusters, standards, and the related performance indicators consistent with the prioritization process, and Form and Function.
8) Develop, adapt, or adopt assessments to be used as a part of the assessment system that assures the distribution of assessment types.
9) Make decisions about which assessments should be common to all students in the district.
10) Recommend policy for replacement assessments considering comparability issues.

[7] Fictional school created for this example to illustrate a possible way to deal with the decision a school/district must make in creating a coherent system, sufficient, and fair local assessment system that will meet the requirements for high school certification

Prioritizing Performance Indicators

The first step in this prioritization was to review the findings from the MDOE Balance of Representation Study conducted in the spring of 2002.

Table 1: Statewide Balance of Representation (BoR) in Mathematics Grades 9 -12

Mathematics										
Number (21%)			Shape and Size (18%)		Mathematical Decision Making (22%)			Patterns (39%)		
A- 7%	B - 6%	I - 9%	E - 11%	F - 7%	C-12%	D - 6%	J - 3%	G - 15%	H - 15%	K - 9%
39%	32%	29%	62%	38%	52%	23%	25%	38%	40%	22%
1 – 50%	1 – 70%	1 – 17%	1 – 29%	1 – 50%	1 – 21%	1 – 51%	1 – 100%	1 – 27%	1 – 27%	1 – 50%
2 – 50%	2 – 30%	2 – 30%	2 – 36%	2 – 50%	2 – 24%	2- 49%		2 – 29%	2- 19%	2 – 50%
		3 – 13%	3- 35%		3 – 20%			3 – 26%	3 – 27%	
		4 – 40%			4 – 21%			4 – 18%	4 – 27%	
					5 – 13%					

BoR across standards

To prioritize performance indicators for assessment in their LAS, the faculty team reviewed the data from the statewide Balance of Representation conducted by the MDOE, but decided to use data that they had previously generated for Balance of Representation. In June 2001, the East Coast School District mathematics faculty met to determine the "relative importance*"(Measured Measures, p. 42)* of each of the performance indicators within each mathematics standard in MLRs. To accomplish this they used the process outlined in Measured Measures on pages 42 and 43.

The decisions found in Table 2 as to which performance indicators must be assessed and which are optional in East Coast School District is the result of this work. The criteria they used to apply the data follow.

Prioritization Criteria for Applying Balance of Representation

1) If a standard or cluster received a higher distribution (greater than 20 points) than the other standards or clusters, then all or most of the performance indicators within the cluster would be required for assessment in the LAS; (E.g., Shape and Size Cluster; Patterns)
2) If the performance indicators received equal weight within a standard and cluster that was not of high priority, then the performance indicators within the standard would be optional, but at least one performance indicator needed to be assessed. (E.g., A. Number of Number Sense)
3) If there were a difference greater than 30% between performance indicators within a standard, then the performance indicators with the greatest weight would be required. (E.g., B.1)

An additional decision made by the team was to require all performance indicators for standards J and K.

Table 2: East Coast School District Performance Indicator Sample for Certification

Standards and Related Performance Indicators	Sampling Rule	Prioritization Criteria Applied for Decision
A. Number and Number Sense 1. Describe the structure of the real number system and identify its appropriate applications and limitations. 2. Explain what complex numbers (real and imaginary) mean and describe some of their many uses.	At least one is required	1
B. Computation 1. Use various techniques to approximate solutions, determine the reasonableness of answers, and justify the results. 2. Explain operations with number systems other than base ten.	B.1 is required.	3
C. Data Analysis and Statistics 1. Determine and evaluate the effect of variables on the results of data collection. 2. Predict and draw conclusions from charts, tables, and graphs that summarize data from practical situations. 3. Demonstrate an understanding of concepts of standard deviation and correlation and how they relate to data analysis. 4. Demonstrate an understanding of the idea of random sampling and recognition of its role in statistical claims and designs for data collection. 5. Revise studies to improve their validity (e.g., in terms of better sampling, better controls, or better data analysis techniques).	C.1; C.2; and C.4 are required, and at least one other	3
D. Probability 1. Find the probability of compound events and make predictions by applying probability theory. 2. Create and interpret probability distributions.	D.1 required	3
E. Geometry 1. Draw coordinate representations of geometric figures and their transformations. 2. Use inductive and deductive reasoning to explore and determine the properties of and relationships among geometric figures. 3. Apply trigonometry to problem situations involving triangles and periodic phenomena.	E.2 required, and one optional	1
F. Measurement 1. Use measurement tools and units appropriately and recognize limitations in the precision of the measurement tools. 2. Derive and use formulas for area, surface area, and volume of many types of figures.	F.1 and F.2 required	1
G. Patterns, Relations, and Functions 1. Create a graph to represent a real-life situation and draw inferences from it. 2. Translate and solve a real-life problem using symbolic language. 3. Model phenomena using a variety of functions (linear, quadratic, exponential, trigonometric, etc.). 4. Identify a variety of situations explained by the same type of function	G.1; G.2; and G.3	1
H. Algebra Concepts 1. Use tables, graphs, and spreadsheets to interpret expressions, equations, and inequalities. 2. Investigate concepts of variation by using equations, graphs, and data collection. 3. Formulate and solve equations and inequalities. 4. Analyze and explain situations using symbolic representations.	All required	1
I. Discrete Mathematics 1. Use linear programming to find optimal solutions to a system. 2. Use networks to find solutions to problems. 3. Apply strategies from game theory to problem-solving situations. 4. Use matrices as tools to interpret and solve problems.	Choice of either I.2 or I.4 required	1 and 2
J. Mathematics Reasoning 1. Analyze situations where more than one logical conclusions can be drawn from data presented.	J.1 required	
K. Communication 1. Restate, create, and use definitions in mathematics to express understanding, classify figures, and determine the truth of a proposition or argument.. 2. Read mathematical presentations of topics within the Learning Results with understanding	K.1 and K.2 required	

Table 3: Relationship Between Cluster, Standards and Required Performance Indicators as Determined by Squirrel High School's Prioritization Process

Mathematics										
Number			Shape and Size		Mathematical Decision Making			Patterns		
A	B	I	E	F	C	D	J	G	H	K
1/2	1/2	1/4	2/3	2/2	3/5	1/2	1/1	3/4	4/4	2/2
3/8			4/5		5/8			9/10		
21/31 Performance Indicators Must be Assessed										

Note: The number of performance indicators reflected in this table does not necessarily reflect the balance of the final distribution of assessments as outlined in Table 5.

Assessment Types and Distribution

The East Coast School District decided to rely heavily on smaller assessments administered frequently within the instructional program over larger assessments. However, the faculty also felt it was important that every East Coast School District student complete one major mathematics project completed during their third year of school. It is the responsibility of the faculty members to assure that this opportunity is provided to every Squirrel High School mathematics student.

In distributing the assessment types, the district has decided to sample every content cluster 10 times instead of five times to be able to provide enough information to report student level information on a cluster.

Table 4: Distribution of Assessment Types

Assessment Type	Number of Assessments	Number Common
Bundles	14	14
Structured Response	8	8
Projects	1	1
	23	23

Table 5: Assessments Distribution Blueprint

Mathematics											
	Number			Shape and Size		Mathematical Decision Making			Patterns		
Assessments	**A**	**B**	**I**	**E**	**F**	**C**	**D**	**J**	**G**	**H**	**K**
Bundle 1	4	4									
Bundle 2				4							
Bindle 3					4						
Bundle 4				8							
Bundle 5					4						
Bundle 6						8					
Bindle 7							4				
Bundle 8									8		
Bundle 9										4	
Bundle 10	4	4									
Bundle 11			8								
Bundle 12				8							
Bundle 13						8					
Bundle 14	4		4				4				
Buried Treasure				4					4		
The Number Line	4										
Buying a Jet Ski									8	4	
Bagels and Donuts									4	4	4
Surprise		4	4								
Community Growth									4	4	
Probability Booth		4					4	4			
Probability Again							8	4			
Exploratory Project I				12							
Total Points By Clusters	40			44		44			48		
	176										

The bolded assessments (MAP and LAD) have been or are being developed to meet the Standards for Assessment. The faculty members agreed on a process for developing Bundles, and the required project to meet Standards for Assessments as required in Chapter 127.

Maine Educational Assessment (MEA)

The district team members explored ways in which MEA could be included as a part of the Certification decision. At first they wanted to include MEA as an assessment type. However, they read the Guidelines provided by MDOE about standardized assessments.

> Standardized norm-referenced tests and other commercial assessments (norm-referenced or criterion-referenced) can play an important role in a local assessment system, although they are not necessary for certification. The loosely defined class of assessments referred to as standardized tests (norm-referenced achievement tests like the TerraNova, ITBS, Stanford-10 or other commercial assessments) are not classified as separate assessment types in and of themselves. The variation in the content and complexity among those instruments does not permit identification of the standardized test as an assessment type. Each standardized assessment *item* considered for inclusion in the system must be reviewed to ensure alignment with Maine's *Learning Results*.

As the discussion continued they realized that there were other reasons why it would be difficult to include it as an assessment type.

1) There would not be opportunities for replacement;
2) The MEA does not provide the level of timeliness of feedback to inform individual instruction that they wished to have as a feature of their system.

The faculty decided that they could use the MEA as a standard against which to compare their common assessments for consistency.

Comparability, Replacement, Performance Standards, and Public Reporting

A district wide panel will decide how East Coast School District will implement the criteria for Comparability, Replacement, Performance Standards, and Public Reporting. Members of the mathematics faculty will serve on that working group to assure that the unique features of mathematics are represented in the district wide decision-making.

After considerable discussion the faculty identified the following values as they relate to Comparability, Replacement, Performance Standards, and Public Reporting.

Comparability

The mathematics faculty made the following recommendations relating to comparability.

6) All students are included in local assessments through any combination of standard administration, administration with accommodation, or by alternate assessments. The distribution of assessment types is the same for all[8] ECSD students.
7) Since all students take the same 3-year sequence *all assessments are common*.
8) Item Specifications for each assessment type have been developed for each assessment type.
9) All assessments used for certification are on a 4-point scale. Each 4 – point scale is linked to a specific performance indicator.
10) All assessments used for certification have at least 20% of the student papers for double scored. Prior to scoring student work for certification, all teachers will have been trained to score to a rubric, and then qualify to score using prescored papers.
11) All assessments for certification are selected, adopted or developed to meet the Standards for Assessment.

[8] Students with an Individualized Education Plan (IEP) or 504 Plan, and students with limited English proficiency are provided with appropriate accommodations identified in Individual Educational Plans.

Replacement:

ECSD Faculty recommends the following guidelines regarding replacement for certifying a student for graduation. These gu8delines will be reviewed at the end of each year of implementation. Adjustments will be made, as needed, that respond to balancing concerns about fairness and resources.

1) Students will be provided the opportunity to replace a weaker performance with a stronger performance at the end of every school year if the total number of aggregated points at the end of the third marking period of a given year indicates that the student is not on schedule for graduation. Not on schedule means that the "mean" performance based upon assessments taken to date is less than the mean expected for graduation.
2) ECDS will inform all students and their parents/guardian if the student is not on schedule for graduation at the end of the third marking period of each school year. The notification will indicate the content area, the cluster(s), and the standard(s) in which the performance is low.

Table 6: Yearly 3rd Quarter Review (Shaded area)

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Integrated 1				
Integrated 2				
Integrated 3				

3) The student must receive additional instruction before they take a replacement assessment. (Note: It is the student's responsibility to arrange for additional instructional time with the classroom teacher.)
4) A student may have only two replacement opportunities per assessment, and only if the student is in danger of not meeting certification requirements graduation.
5) Replacement of assessments must maintain the distribution of assessment types across the grade span and follow Form and Function.

District mathematics faculty agrees that students should be allowed to replace weaker performances with stronger performances only if they are in jeopardy of not graduating. They think there should be a limit on the number of times (3) that a student is allowed to replace an assessment for the following reasons.

1) There are limited available resources – both replacement assessments and instruction.
2) Instructional time – The need to move on to additional topics for students to progress;
3) There are a number of assessments in the system that provide other opportunities to assess the same content standards and related standards and performance indicators.

The district team believes that Replacement should happen at the standard level.

Reporting

The district mathematics faculty agrees the decision for Certification should be made at the content level. To meet the criterion for reporting school level information at the cluster level, the district elected to assess a cluster at least ten times, understanding that the minimum requirement is five times.

Standard Setting

ECSD has recommends adopting the MDOE performance standards, "Percent of Points Earned".

Recommended: "Percent of Points Earned"

Students must earn the specified percentage of all possible points for the content area and no fewer than the specified percentage of the available points for any content cluster to achieve each level of performance.

Performance Level	All Points	No Cluster Lower Than
1. Does Not Meet	0-37.4%	
2. Partially Meets	37.5-62.4%	
3. Meets	62.5-87.4%	37.5%
4. Exceeds	87.5%-100%	62.5%

Appendix A: DRAFT Item Specifications for Assessment Types

Assessment Type Structured Response	**Recommended Cluster/Standards/Performance Indicators Assessed**	**Recommended Structure/Format/Setting**	**Example MAP or LAD Assessments**
General Description: **A structured response assessment is defined by students being provided a set of guiding questions and/or formats in which to respond to a topic or problem. To respond to this assessment type, the student does not have to make decisions about the questions that need addressing, or the format in which to respond.** **Each structured response should assess content and process either by assessing standard J or K or through the implied cognitive demand of the performance indicator assessed**. Replacement: **A structured response should be replaced with another structured response that assesses the same standard.**	All clusters, standards and performance indicators	**Student interaction**: Same as general description. **Structur**e: A prompt or set of prompts that describes a problem situation and asks for a student response with a clear expectation of what is expected of students. **Setting:** Structured response items are treated as a whole. The items take at least one class period to complete and may require extended time.	**Examples** Buying a Jet Ski **Points:** Depending on the number of dimensions tested a structured response ranges from 8 (2 dimensions) to 16 (4 dimensions) points

Assessment Type: Projects		**Structure**	**Points Possible**
General Description: **There are 2 types of projects at Moose High School.** ❑ **Concept Development Project** Replacement: **Projects should be replaced with another project within the same content cluster, or same standard. If the project is the only assessment of a standard then the replacement should be within the same standard in order to maintain the distribution.**	**Concept Development Projects** E.2, K, and L.	**Students Interaction:** Students may select the topic or the teacher may assign the topic or project to be completed. Students work independently. **Structure:** Common guidelines are being developed for the three types of projects. **Concept Development Project**: Students identify or are provided with a concept to study. There are two aspects to this project: 3) Fully explaining the concept using models and other representations. (E.g. written summary, posters, other) 4) Providing examples of how the concept is applied.	**Points:** **Concept Development:** 20 points .

Assessment Type: Bundle	**Recommended Cluster/Standards/Performance Indicators Assessed**	**Recommended Structure/Format/Setting**	**Example MAP or LAD Assessments**
General Description: **A bundle is a set of selected response, short answer, or short constructed response questions that assess a single performance indicator that has multiple components, or multiple related performance indicators.** Replacement: **A weak performance on a bundle should be replaced by Bundle in the same standard.**	**Mathematics**: All clusters but not J and K. .	**Students Interaction:** Student responds to prompt. **Structure:** • Each component in a bundle should include a series of questions that relate to a single performance indicator or related performance indicators. • The format of the questions could include a combination of selected response, short answer, and constructed response but should not be limited to selected response. **Interaction of process and content:** Bundles assess only content performance indicators. **Setting:** Bundles should be administered within the class setting.	High School ❑ Down Below ❑ Ode to a Fraction, ❑ Which Base are bundles?